

NOTE

Asphondylia (Diptera: Cecidomyiidae) Does Not
Reflect the Disjunct Distribution of
Larrea (Zygophyllaceae)

Larrea has a disjunct North and South American distribution. One species, *Larrea tridentata* (DC.) Coville or creosote bush, occurs in southwestern North America, well separated from the remaining four species in the genus that are restricted to southern South America. These four are: *Larrea ameghinoi* Speg., *L. cuneifolia* Cav., *L. divaricata* Cav., and *L. nitida* Cav. *Larrea divaricata*, the South American species that most closely resembles the Nearctic *tridentata*, is the most widespread in South America, extending from Argentina west into Chile and as far north as Peru; *nitida* extends from Argentina into Chile, but the remaining two species are restricted to Argentina (Mabry et al., eds. 1977. *Creosote Bush, Biology and Chemistry of Larrea in New World Deserts*, Dowden, Hutchinson & Ross, Inc., Stroudsburg, PA, USA., xvi & 284 pp.; Waring. 1986. *Agave* 2(1): 3-15).

The galls of *Larrea tridentata* have been extensively investigated in Arizona (Waring. 1987. Ph.D. dissertation, Northern Ariz. Univ., Flagstaff, 75 pp.; Waring and Price. 1989. *Oecologia* 79: 293-299). Gagné and Waring (1990. *Proc. Entomol. Soc. Wash.* 92: 649-671) treated the 15 *Asphondylia* spp. known from creosote bush in Arizona. Each of them forms a distinct gall on some part of the host. Gagné and Waring (ibid.) hypothesized that those 15 species, which they dubbed the *Asphondylia auripila* group, were probably monophyletic, but were unable to say what the closest relative of this group might be, particularly in view of the possibility that they might occur on *Larrea* in South America. To date no gall midges have

been reported from *Larrea* in South America, presumably because of lack of collecting.

We were in Argentina during January and February, 1990, in search of insect pests for use in biological control of weedy plants, including *Larrea*, in southwestern United States. We examined closely *Larrea* spp. for insect damage at 15 sites from south-central to northwestern Argentina. We spent a combined two to three hours with *Larrea* at each site. During that time we discovered only two kinds of galls, both caused by gall midges. Both types of galls were common on *L. divaricata* wherever we found that plant in Argentina, but were never found on the other *Larrea* species, even when they grew intermixed with *divaricata*.

One gall consists of a pair of slightly enlarged leaves that are coalesced along their edges to form a biconvex, hollow gall. The inside is often filled with resin. The gall is analogous to that made by the *Contarinia* sp. on *Larrea* in North America (Gagné 1989, Waring 1987). We were too late in the season to find specimens of the gall-maker, except for one dead gall midge larva, which is in poor condition and does not belong to *Contarinia*.

The other gall is a complex pineapple-like growth superficially similar to that made by *Asphondylia rosetta* Gagné in Arizona (Gagné and Waring, ibid.). It is composed of a large number of leaves growing along a greatly foreshortened stem, resulting in an elongate rosette. In the gall of *A. rosetta*, a single larva lies in a closed chamber in the stem. In the Argentine gall the larva may be solitary or gregarious and lives freely but

covered with resin among the leaves. We were too late to find active larvae for this species also, but we found dead or moribund larvae in many of the galls. These larvae represent a species new to science, but they do not fit in *Asphondylia* or any other genus known to us. They are greatly modified in a way analogous to the larvae of *Cecidomyia*, which are found immersed in resin of conifers in the Northern Hemisphere, in that the spiracles of the eighth abdominal segment are greatly enlarged and directed posteriorly beyond the anal segment.

Although *Asphondylia* is known from other hosts in southern South America (Gagné, 1969. A Catalogue of the Diptera of the Americas South of the United States, São Paulo, Brazil 23: 1-62), we saw no sign of any species on *Larrea*. This suggests to us that the *Asphondylia auripila* group orig-

inated in southwestern North America in a shift from another host and that its closest relatives will probably be found there.

This topic is the kind that greatly interested Don Whitehead, so we gladly add it to the celebration of his memory in this memorial issue of the *Proceedings*. We are grateful to Hugo Cordo of the Biological Control of Weeds Laboratory, ARS, Buenos Aires for his help with our projects in Argentina and to A. S. Menke, G. S. Steyskal, N. E. Woodley, and G. L. Waring for reading and commenting on this manuscript.

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